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UNITED STATES
DEPARTMENT OF AGRICULTURE

DEPARTMENT CIRCULAR 258

Washington, D. C. April, 1923

TURPENTINE AND ROSIN.

DISTRIBUTION OF THE WORLD'S PRODUCTION, TRADE, AND CONSUMPTION.

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WORLD PRODUCTION.

Before the last war the approximate annual world production of the two most important commodities coming under the term "naval stores" was about 52,000,000 gallons [1] of turpentine and, in terms of American packages, about 2,900,000 round barrels (500 pounds gross) of rosin. According to the best information available, the average annual world production since the outbreak of the war has been from 20 to 25 per cent less than it was before the war. This is due chiefly to the decrease in the American supply, caused by the depletion of timber suitable for turpentine operations.

No official statistics on the production of turpentine and rosin are published by any of the countries in which they are produced, with the exception of the United States and British India. Prior to 1918, the Bureau of the Census, United States Department of Commerce, issued, at 5-year intervals, statistics on the domestic production of turpentine and rosin from both gum and wood. In 1918, 1919, and 1920 the Bureau of Chemistry published semiannually statistics on naval stores production. Since 1921 the Bureau of Chemistry and the Bureau of the Census jointly have published annual statistics on naval stores production and stocks in the hands

[1] The term "gallon" means the United States standard gallon of approximately 231 cubic inches. Foreign statistics in which the British imperial gallon, equivalent to 1.2 United States gallons, is used as a unit, have been converted into terms of the United States gallon. Where statistical data are given by weight, the corresponding volume in gallons has been calculated on a basis of 7.2 pounds, or 3.265 kilograms, per gallon.

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of producers and consumers and at ports and distributing points. Trade estimates based on information as to the movement of turpentine and rosin from the stills to the main southern naval stores ports are published in the trade journals shortly after the close of each naval stores season (March 31).

Estimates of the production of naval stores in some of the more important producing countries abroad have become available to the Bureau of Chemistry through various sources, particularly in the reports of American trade commissioners and consuls and through correspondence with persons who are closely connected with the foreign naval stores trade. These have been supplemented by estimates calculated from various scattered articles, news items, or other bits of information which have appeared from time to time in domestic and foreign trade and scientific publications, and also by estimates based on such data as the trend and extent of the exports from certain countries. The figures thus obtained have been compiled in tabular form, to show the approximate distribution of the annual production of naval stores throughout the world, by countries and by periods before the war, during the war, and since the close of the war. While no claim for absolute accuracy can therefore be made, it is believed that the data given show, in a general way and fairly reliably, the relative importance of the countries as sources of turpentine and rosin. The quantities reported include both gum and wood products.

Trade statistics and estimates on production, imports, and exports of rosin are usually given by most foreign countries in terms of net weight. Holland, Italy, and Austria-Hungary are the three most important foreign countries of which the imports of rosin are stated as gross weight.

The American "round barrel" of rosin weighs on the average approximately 500 pounds gross and the tare on this is approximately 17 per cent. French rosin is put up in barrels weighing between 800 and 900 pounds, with a tare of from 7 to 10 per cent. The Spanish and Portuguese rosin barrel is somewhat smaller than the French, and the tare is from 6 to 8 per cent.

The figures on rosin in all of the tables are in terms of the regular American package or "round barrel" of 500 pounds gross weight. In converting foreign figures into terms of American gross "round barrels" for Tables 2, 7, and 8, the proper allowance for the tare of the package of each country has been made.

The United States furnishes between 60 and 65 per cent of the world's supply of turpentine and from 70 to 75 per cent of the world's rosin. The principal reason for the difference between the two is the fact that in Russia, Finland, Sweden, Norway, and Poland wood turpentine is produced chiefly by the destructive distillation of wood, in which process no rosin is recovered. In Sweden a so-called turpentine and a so-called liquid rosin ("tall-öl") are recovered as a by-product in the manufacture of paper pulp. A relatively small quantity of so-called "spruce turpentine" is recovered at several paper mills in this country.

The southern longleaf yellow pine (*Pi us palustris*) and the Cuban or slash pine (*P. caribæa* or *heterophylla*) furnish practically all the American naval stores. In France, Spain, and Portugal the maritime pine (*P. pinaster*) and closely related varieties are used for this pur-

pose, while in Greece and Algeria the Aleppo pine (*P. halepensis*) is the principal source of naval stores. Indian turpentine comes from the Chir pine (*P. longifolia*) and the Bhotan pine (*P. excelsa*); Austrian turpentine, from the black pine (*P. laricio Austriaca*); Italian turpentine, from the stone pine (*P. cembra*); Mexican turpentine, from the Ocote pine (*P. teocota*), the Mexican white pine (*P. ayacahuite*), and the Western yellow pine (*P. ponderosa*). The principal coniferous tree growing throughout Norway, Sweden, Finland, Russia, Poland, and central Germany is the Norway pine, known also as Scotch fir (*P. sylvestris*). This tree furnishes most of the naval stores produced in those countries.

TABLE 1.—*Approximate annual production of naval stores, by countries.*

Country.	Average production.					
	1910–1913 (pre-war years).		1915–1918 (war years.)		1919–1920 (post-war years).	
	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.
	Gallons.	*Round bbls.*	*Gallons.*	*Round bbls.*	*Gallons.*	*Round bbls.*
United States	32,925,000	2,142,000	23,875,000	1,584,000	23,000,000	1,576,000
France	7,150,000	433,000	5,282,000	319,000	9,186,000	546,000
Russia	7,500,000	12,800	(1)	(1)	(1)	(1)
Spain	1,566,000	93,000	1,688,000	98,000	1,363,000	88,000
Greece	700,000	51,000	400,000	28,000	375,000	25,000
Portugal	550,000	34,000	443,000	25,000	827,000	50,000
Sweden	(1)	(1)	700,000	14,000	600,000	8,000
Finland	200,000	3,000	250,000	10,000	300,000	14,000
India	50,000	4,000	155,000	11,000	183,000	14,000
Mexico	50,000	4,000	15,000	1,000	30,000	3,500
Austria	60,000	4,500	(1)	(1)	(1)	(1)
Italy	32,000	2,000	22,000	1,500	(1)	(1)
Norway	(1)	(1)	(1)	(1)	400,000	5,000
China	60,000	5,000	180,000	15,000	250,000	20,000
Germany	None.	None.	20,000	1,500	30,000	2,000
Poland, French Indo-China, Central America, Japan, Algeria, British South Africa	(1,2)	(1,2)	(1,2)	(1,2)	(1,2)	(1,2)
Total[3]	52,000,000	2,900,000	36,000,000	2,200,000	38,000,000	2,400,000

[1] No data available.
[2] Quantities relatively small.
[3] The figures for total world production include a rough estimate of the production of those countries for which no reliable data are available.

WORLD CONSUMPTION.

The approximate annual consumption of naval stores in the more important countries of the world has been estimated from the available data on imports and exports of naval stores, both American and foreign, in connection with the data given in Table 1. The countries listed use more than 95 per cent of the total world consumption. Countries not listed either publish no statistics on imports of turpentine and rosin, or import such small quantities that they need not be included. The data are given in Table 2, in the form of annual averages by periods, for each country. They show clearly the relative consumption in each country and also, by comparison with the figures in Tables 3, 4, 5, 6, 7, and 8, give a basis for a definite opinion on the possibility of developing markets for surplus American supplies.

TABLE 2.—*Approximate annual consumption of naval stores by countries.*

Country.	Average annual consumption.					
	1910–1913 (pre-war years).		1915–1918 (war years).		1919–1920 (post-war years).	
	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.
	Gallons.	*Round bbls.*	*Gallons.*	*Round bbls.*	*Gallons.*	*Round bbls.*
United States	14,435,000	761,800	16,055,500	864,100	12,957,500	911,450
Germany	8,716,000	428,800	(1)	(1)	1,234,000	111,000
Great Britain	8,077,000	412,370	4,359,000	380,960	6,695,000	387,730
France	4,560,000	156,960	4,589,000	157,330	6,402,500	256,800
Russia	4,380,000	171,000	(1)	(1)	(1)	(1)
Austria-Hungary	3,162,000	162,000	(1)	(1)	(1)	(1)
Belgium	1,313,000	52,000	(2)	(2)	433,000	34,000
Canada	1,160,000	53,360	1,176,000	75,150	974,000	69,350
Italy	998,000	81,920	795,000	92,320	831,500	73,060
Holland	1,146,000	34,400	454,000	13,060	770,000	19,200
Argentina	589,000	81,900	464,000	80,530	585,000	74,670
Australia	616,500	36,000	650,500	36,000	460,000	28,620
Brazil	329,000	93,330	264,000	86,510	318,000	90,670
Spain	408,000	44,590	678,000	45,060	200,000	21,340
Switzerland	469,000	12,340	416,000	18,180	511,000	8,970
Greece	300,000	23,460	250,000	10,000	270,000	13,350
Portugal	330,000	16,000	350,000	10,660	600,000	10,000
Sweden	260,000	29,800	635,000	11,950	525,000	18,500
India	303,000	17,010	245,000	16,700	262,000	13,380
Denmark	146,000	7,650	97,000	7,150	162,500	11,070
British South Africa	155,500	5,350	155,000	7,510	138,500	8,850
Chile	171,000	4,910	167,000	7,300	156,000	6,850
New Zealand	198,000	5,180	118,000	5,090	67,500	3,500
Japan	40,000	27,200	50,000	60,530	35,000	65,000
Cuba	65,000	16,000	100,000	17,330	83,000	14,930
Dutch East Indies	30,000	32,300	21,000	24,300	10,000	17,100
Roumania	97,500	12,900	(1)	(1)	(1)	(1)
Uruguay	60,000	17,000	54,000	13,600	75,000	13,000
Norway	45,000	16,140	75,000	18,420	90,000	10,800
Peru	51,000	3,160	51,000	2,120	50,000	1,800
Mexico	25,000	5,000	20,000	2,000	75,000	6,000
Total	52,635,500	2,821,830	32,289,000	2,063,860	34,971,000	2,300,990

[1] No data available. [2] Practically none.

No explanation of the apparent discrepancy between the data on the total world production prior to the war and the total consumption in the countries listed in Table 2 can be offered. The figures in Table 2 are based on the import and export data of the countries listed, the accuracy of which in some cases is open to question. For instance, the Dutch official data on exports of rosin from Holland into Germany are entirely at variance with the German official data on the importation of rosin by Germany from Holland. Other apparent discrepancies of this nature have also been found, but since there is no way to verify them, each country's data must be accepted at their face value. American consular representatives have called attention to apparent inaccuracies in certain foreign trade statistics. Moreover, the estimates on production given in Table 1, while they are the best figures available, may not be exact in some cases.

The United States not only produces most of the world's turpentine and rosin but also uses a larger part of it than any other country. Roughly, it consumes between 35 and 40 per cent of the total world supply of turpentine and about 30 per cent of the rosin. As indicated by recent data collected by the Bureau of Chemistry, this consumption is distributed approximately as follows:

	Per cent.
Turpentine:	
Paint and varnish industry	45
Shoe, floor, and other polishes	6
Automobiles, wagons, cars, etc. (painting)	3
Medicinal and pharmaceutical preparations	2
Other industrial uses	4
For thinning down paint and varnish, and other miscellaneous purposes	40
Rosin:	
Soap making	42
Paper and paper sizing	25
Paint and varnish	17
Rosin oil, pitch, and printing ink	6
Linoleum and similar coverings	3
All other uses	7

In England, at present the second largest consumer of naval stores, the distribution of consumption is probably similar to that of the United States.

The distribution of consumption in Germany is as follows: [2]

	Per cent.
Turpentine:	
Shoe and other polishes	26.0
Paint and varnish manufacture	16.0
Chemical industries (synthetic camphor, synthetic rubber, and other products)	16.0
Miscellaneous (including thinning down paint and varnish before application)	42.0
Rosin:	
Rosin products (rosin oil, pitches, and similar products)	30.0
Paper making	29.0
Soap making	10.0
Paint and varnish manufacture	8.0
Linoleum and similar products	6.5
Printing and lithographic inks and varnish	5.5
Electrical and other insulating purposes	5.0
All other uses	6.0

Among the interesting points brought out by the data in Tables 1 and 2 is the development of the industry in China. Most of the Chinese rosin is exported to Hongkong, Japan, Australia, New Zealand, and the Dutch East Indies. The industry is being rapidly expanded also in India and Finland, and the possibilities for its expansion in Mexico are considered promising. The growth of the French industry since the war has been remarkable. Owing to carefully followed plans of working the timber and reforestation, the French crop can be kept at this level or even increased. The industry in British South Africa, confined to the Orange Free State, and begun probably in 1918, is the most recent addition to the widespread production of naval stores. The German industry is a development of the need for naval stores during the war when outside sources of supply were cut off. The possibilities for expansion in Germany are small. Before and during the war, extensive experiments were carried on in Russia and Poland, by the owners and by the invading German armies, to determine the practicability of producing gum turpentine and rosin by the so-called French process.

UNITED STATES PRODUCTION AND EXPORTATION.

Tables 3 and 4 show the production and apparent domestic consumption of turpentine and rosin in the United States and the foreign trade in these commodities in detail for a period of years.

[2] K. Bury, Deutschland und die weltwirtschaftliche Lage, German Foreign Office, Section 10, Foreign Commerce (1921).

TABLE 3.—*Spirits of turpentine: Production, trade, and apparent domestic requirements of the United States.*

	1910-11	1911-12	1912-13	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19	1919	1920	Average.		
												1910-1913	1914-1918	1919-1920
Estimated production:	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*
Gum turpentine [1]	29,750,000	31,900,000	34,000,000	32,000,000	27,000,000	23,500,000	26,750,000	23,700,000	17,050,000	18,300,000	24,450,000	31,912,500	23,600,000	21,375,000
Wood turpentine [2]	1,250,000	1,000,000	1,000,000	800,000	576,000	700,000	1,000,000	1,200,000	1,600,000	1,500,000	1,750,000	1,012,500	1,015,200	1,625,000
Total	31,000,000	32,900,000	35,000,000	32,800,000	27,576,000	24,200,000	27,750,000	24,900,000	18,650,000	19,800,000	26,200,000	32,925,000	24,615,200	23,000,000
Total imports [3]	204,321	60,913	56,855	68,966	13,750	19,035	18,661	1,670	302	1,662	43,385	97,764	10,684	22,523
Total supply	31,204,321	32,960,913	35,056,855	32,868,966	27,589,750	24,219,035	27,768,661	24,901,670	18,650,302	19,801,662	26,243,385	33,022,764	24,625,884	23,022,523
Total exports [3]	14,817,751	19,599,241	21,039,597	18,900,704	9,464,120	9,310,268	8,841,875	5,095,124	8,064,578	10,672,102	9,458,423	18,589,323	8,155,193	10,065,262
Apparent domestic requirements	16,386,570	13,361,672	14,017,258	13,968,262	18,125,630	14,908,767	18,926,786	19,806,546	10,585,724	9,129,560	16,784,962	14,433,441	16,470,691	12,957,261
Exported to:														
Belgium	2,194,802	1,428,710	1,872,893	1,027,355	113,672	.....	.....	.....	51,281	304,811	293,337	.....	.....	.....
Germany	1,786,336	2,812,160	3,849,191	3,275,929	196,622	.....	.....	.....	.....	10,716	71,590	.....	.....	.....
Great Britain	5,836,285	7,865,713	7,432,271	7,109,851	5,338,724	5,561,957	5,327,100	1,413,732	4,175,590	6,220,048	5,238,621	.....	.....	.....
Holland	1,556,101	3,379,518	4,242,340	4,393,902	625,736	442,682	66,892	.....	492,163	673,653	459,330	.....	.....	.....
Italy	87,489	244,370	161,134	30,000	161,289	108,817	127,654	301,292	204,168	491,424	11,401	.....	.....	.....
All other Europe	62,032	145,621	69,049	8,296	24,364	41,347	78,882	200	195,326	383,504	68,521	.....	.....	.....
Canada	1,097,802	920,612	1,039,768	1,114,863	917,912	1,026,768	1,109,029	978,125	1,017,062	969,776	864,297	.....	.....	.....
Cuba	60,984	61,688	76,702	65,647	58,537	97,356	75,376	117,975	99,481	98,672	67,259	.....	.....	.....
Mexico	12,201	4,972	4,546	7,145	7,558	10,252	11,605	18,180	40,417	47,323	21,788	.....	.....	.....
All other North America	75,343	84,843	79,672	82,881	58,117	93,014	75,085	99,409	73,742	106,508	72,356	.....	.....	.....
Argentina	487,878	647,672	550,549	512,544	497,458	459,460	356,953	321,797	332,498	528,391	636,682	.....	.....	.....
Brazil	286,582	334,240	356,652	301,912	313,190	301,619	301,112	222,339	366,907	307,798	327,423	.....	.....	.....
Chile	135,869	194,231	131,005	84,460	81,662	157,936	104,555	241,234	105,408	46,509	205,231	.....	.....	.....
Peru	34,700	59,618	42,575	34,975	22,174	41,011	59,218	45,001	34,830	29,431	50,965	.....	.....	.....
Uruguay	61,109	64,129	58,552	48,078	60,975	62,319	35,693	49,638	73,033	82,908	73,640	.....	.....	.....
All other South America	33,454	40,852	38,940	37,544	27,111	41,306	40,253	42,065	35,178	45,250	43,831	.....	.....	.....
British India	45,029	97,430	33,390	61,000	25,000	5,155	2,522	44,015	24,000	13,414	17,908	.....	.....	.....
Japan (including Korea)	7,012	51,055	66,025	19,925	52,920	72,280	8,370	88,485	55,599	10,509	44,455	.....	.....	.....
China [4]	10,594	9,560	18,610	9,675	19,880	16,421	18,494	32,502	35,346	40,214	21,263	.....	.....	.....
All other Asia	3,176	11,090	3,868	13,300	18,855	30,996	20,340	27,800	17,594	9,453	1,665	.....	.....	.....
Australia and New Zealand	762,213	858,079	686,369	499,238	708,693	590,700	838,476	942,471	333,379	137,561	780,288	.....	.....	.....
Philippines	28,350	72,634	49,034	8,379	7,845	20,398	13,802	29,318	83,428	49,309	5,847	.....	.....	.....
All other Oceania	1,098	2,855	1,807	1,136	1,086	579	969	2,552	3,187	910	862	.....	.....	.....
British South Africa	124,926	164,425	136,078	112,012	80,630	83,283	142,575	60,000	171,531	45,455	75,121	.....	.....	.....
All other Africa	26,386	43,164	38,577	40,661	44,110	44,612	26,920	16,985	43,430	18,556	4,742	.....	.....	.....

[1] Production statistics, 1910-1919, for gum turpentine are for naval stores seasons, from April 1 to the following March 31.
[2] Production statistics, 1910-1919, for wood turpentine are for calendar years, the figure in first column being for 1910.
[3] Import and export statistics, 1910-1918, are for Government fiscal years, from July 1 to the following June 30. Subsequent data have been published for the calendar year instead of the fiscal year.
[4] Including Hongkong and leased territories.

TABLE 4.—*Rosin: Production, trade, and apparent domestic requirements of the United States.*

	1910–11	1911–12	1912–13	1913–14	1914–15	1915–16	1916–17	1917–18	1918–19	1919	1920	Average.		
												1910–1913	1914–1918	1919–1920
	Round bbls.	*Round bbls.*	*Round bbls.*	*Round bbls.*	*Round bbls.*	*Round bbls.*	*Round bbls.*	*Round bbls.*	*Round bbls.*	*Round bbls.*	*Round bbls.*			
Estimated production:														
Gum rosin [1]	1,970,000	2,125,000	2,267,000	2,132,000	1,706,000	1,565,000	1,782,000	1,531,000	1,115,000	1,237,000	1,577,000	2,123,500	1,539,800	1,407,000
Wood rosin [2]	14,000	16,000	20,000	24,000	29,000	40,000	80,000	100,000	123,000	158,000	180,000	18,500	74,400	169,000
Total	1,984,000	2,141,000	2,287,000	2,156,000	1,735,000	1,605,000	1,862,000	1,631,000	1,238,000	1,395,000	1,757,000	2,142,000	1,614,200	1,576,000
Total imports [3]	892	55	600	5,484	3,012	11,140	260	108	420	192	288	1,758	2,988	240
Total supply	1,984,892	2,141,055	2,287,600	2,161,484	1,738,012	1,616,140	1,862,260	1,631,108	1,238,420	1,395,192	1,757,288	2,143,758	1,617,188	1,576,240
Total exports [3]	1,226,180	1,385,698	1,571,386	1,354,052	768,497	879,916	917,610	599,720	493,993	677,391	652,024	1,384,329	731,947	664,707
Apparent domestic requirements	758,712	755,357	716,214	807,432	969,515	736,224	944,650	1,031,388	744,427	717,801	1,105,264	759,428	885,241	911,533
Exported to:														
Austria, Hungary, Czechoslovakia	36,207	58,217	47,079	38,168	.....	.....	.....	.....	120	1,674	1,255	.....	.....	.....
Belgium	67,730	91,473	78,967	62,572	44,950	.....	.....	.....	2,057	8,189	17,396	.....	.....	.....
Germany	414,380	381,627	453,457	447,544	29,865	.....	.....	.....	.....	55	17,534	.....	.....	.....
Great Britain	224,269	281,969	352,887	282,464	280,305	312,262	377,030	153,987	211,672	282,514	167,939	.....	.....	.....
Holland	97,926	108,949	127,882	138,510	27,374	10,178	403	.....	6,375	13,750	6,419	.....	.....	.....
Italy	44,285	57,504	64,971	61,253	52,762	65,934	30,759	5,631	9,314	10,343	18,366	.....	.....	.....
Russia (including in Asia)	43,781	54,938	80,268	81,006	4,218	63,245	68,727	2,043	.....	225	302	.....	.....	.....
Scandinavian countries	1,258	1,914	1,441	1,450	55,724	89,366	43,276	715	24,128	24,539	32,814	.....	.....	.....
All other Europe	5,920	4,474	9,614	529	376	1,456	70	96	1,483	1,517	6,863	.....	.....	.....
Canada	43,155	52,340	49,879	43,156	41,503	67,282	96,644	72,279	50,933	39,937	57,474	.....	.....	.....
Cuba	13,334	14,278	13,425	13,469	16,692	16,144	18,120	19,295	13,455	15,175	14,059	.....	.....	.....
All other North America	4,521	5,798	6,456	5,727	7,679	5,933	7,516	2,972	4,204	3,124	4,349	.....	.....	.....
Argentina	48,745	68,506	73,520	57,136	80,308	54,491	67,361	83,740	44,252	65,356	76,353	.....	.....	.....
Brazil	97,335	99,100	101,193	54,688	59,096	74,225	82,579	88,941	50,009	86,527	82,300	.....	.....	.....
Chile	3,790	3,373	6,391	2,654	1,618	3,430	6,854	7,222	4,271	5,800	6,366	.....	.....	.....
Uruguay	18,143	16,951	19,639	10,630	13,546	12,879	13,573	12,903	16,166	13,387	12,571	.....	.....	.....
All other South America	13,991	16,610	17,012	9,834	7,679	12,272	14,373	14,766	10,752	11,672	9,777	.....	.....	.....
China [4]	1,528	1,196	1,599	1,482	1,685	8,590	2,532	4,725	794	6,100	4,938	.....	.....	.....
Japan (including Korea)	13,779	21,044	22,704	8,071	18,674	49,382	31,630	57,726	16,387	59,423	52,186	.....	.....	.....
Dutch East Indies	6,880	8,804	8,841	1,261	4,072	12,233	22,214	15,472	6,349	14,974	23,447	.....	.....	.....
All other Asia	3,950	10,526	4,769	2,329	1,616	418	1,249	3,093	1,002	1,228	2,674	.....	.....	.....
Australia	17,412	21,941	23,852	25,614	15,630	16,841	26,046	40,479	12,818	9,328	30,625	.....	.....	.....
New Zealand	1,866	3,091	3,422	2,526	1,558	972	1,966	2,283	717	503	3,840	.....	.....	.....
All other Oceania	76	185	435	472	301	238	580	1,044	1,604	582	131	.....	.....	.....
British South Africa	972	549	1,533	1,394	1,165	1,948	3,447	10,302	5,078	1,425	2,024	.....	.....	.....
All other Africa	947	341	150	113	101	197	641	6	45	44	22	.....	.....	.....

[1] Production statistics for gum rosin are for naval stores seasons, from April 1 to the following March 31.
[2] Production statistics for wood rosin are for calendar years, the figure in the first column being for 1910.
[3] Import and export statistics, 1910–1918, are for Government fiscal years, from July 1 to the following June 30. The data for 1919 and 1920 are for calendar years.
[4] Including Hongkong and leased territories.

The effect of the war on the American foreign trade in naval stores is clearly shown. From an annual average of nearly 19,000,000 gallons of turpentine and 1,400,000 round barrels of rosin, exports during the war fell to an average of a little more than 8,000,000 gallons of turpentine and 730,000 round barrels of rosin. Exports of turpentine have shown a decided increase since the war, the average for 1919 and 1920 being more than 10,000,000 gallons. On the other hand, the average exports of rosin for 1919 and 1920 were 665,000 round barrels less than they were during the war. For the calendar year 1921 there were exported 9,267,959 gallons of turpentine and 560,864 round barrels of rosin, which, deducted from a total production of approximately 24,751,000 gallons and 1,684,000 round barrels, respectively, left for domestic purposes about 15,483,000 gallons of turpentine and 1,123,000 round barrels of rosin. In 1922 there were exported approximately 9,864,000 gallons of turpentine, including 495,000 gallons of wood turpentine, and 799,000 barrels of rosin. The exports of naval stores from the United States to Belgium, Germany, Holland, and Italy in 1921 showed a decided increase, which, however, was offset by a decrease in the exports to most of the other countries listed in Tables 3 and 4, particularly Great Britain and the South American countries. In 1922, on the other hand, exports of turpentine to Belgium, Germany, and Holland again decreased, but there was a corresponding increase in the exports to the rest of the world. Argentina, Australia, and Japan were the only important countries importing American rosin which took less in 1922 than in 1921. Exports to the rest of the world showed a decided increase.

The increase since the outbreak of the war in American exports of rosin to the Scandinavian countries is interesting. This is due not only to an increase in their consumption of this commodity but also to a decrease in their importations from Germany, and, to a less extent, from Holland and Belgium. In other words, the Scandinavian countries are buying more of their American-made naval stores in the United States instead of secondhand from German dealers in Hamburg and Bremen and Belgian and Dutch dealers in Antwerp and Rotterdam. A large proportion of the naval stores imported from the United States by Belgium and Holland are reexported (average annual imports in Tables 5, 6, 7, and 8, and annual consumption in Table 2). A large part of the naval stores exported by these countries goes into Germany, passing through Rotterdam and Antwerp, whence it is shipped by river and canal to the German manufacturing districts in the Rhine Valley.

DISTRIBUTION OF WORLD TRADE.

Tables 5, 6, 7, and 8 show where practically all of the more important naval-stores-importing countries for which such itemized data are available get their supplies. Uruguay and Norway are important enough to be included in these tables, but the itemized data for Uruguay are incomplete in consecutive numbers of the Uruguayan statistical annual. About 80 per cent of Uruguay's rosin requirements come from the United States; the rest comes from Argentina (American rosin, reexported), Great Britain (also reexported goods), France, and Spain. No itemized imports by countries of origin are given for Norway. Canada and Cuba, which secure practically all of their naval stores from the United States, are omitted also.

The data in these tables have been taken from the statistical annuals of the various countries. During the period of the war the trade statistics of many of the countries listed, more especially the European countries, were published in such a manner that complete and reliable data corresponding to those given in Tables 1, 2, 3, and 4 could not be compiled. In some cases no data are available. Moreover, the usual channels of trade and the ordinary demand for naval stores were seriously affected. It was considered inadvisable, therefore, to tabulate the available data for the war period as was done in the preceding tables, since it would not show the sources of supply of these countries under unrestricted conditions.

No attempt to explain any differences between the data on imports from the United States and those on exports from the United States (Tables 3 and 4) can be made. The export statistics are taken from the annual publications, "Foreign Commerce and Navigation of the United States," of the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce.

Many of the data on foreign production and trade in naval stores subsequent to 1920 are at this time either unavailable or incomplete and unreliable. Where they have become available it has been found that inclusion of such later data in the post-war averages would not materially affect the figures as given for 1919 and 1920. The figures for imports and consumption of naval stores in Germany and Belgium would be somewhat higher, but they would be offset by a decrease in imports and consumption in Great Britain and South America. It is believed that the averages for the two-year period, 1919–1920, show better the normal trend in trade and consumption of naval stores than they would were the incomplete figures for 1921 included.

TABLE 5.—*Sources of turpentine imported by foreign countries, 1910 to 1913.*[1]

Importing country.	Average annual imports.	Imported from—																	
		United States.		France.		Spain and Portugal.		Russia.		Greece.		Germany.		Holland and Belgium.		Great Britain.		All other countries.	
	Gallons.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.
Germany	9,187,377	6,588,230	71.7	1,230,158	13.4	95,473	1.0	775,758	8.5	339,270	3.7	.....	.....	55,085	0.6	20,362	0.2	83,041	0.9
Great Britain	8,431,688	6,920,905	82.1	381,107	4.5	93,844	1.1	895,342	10.6	1,902	.....	49,635	0.6	(2)	(2)	.....	.....	88,953	1.1
Holland	3,570,234	3,232,330	90.5	46,563	1.3	.....	.....	42,015	1.2	53,191	1.5	9,405	.3	172,649	4.8	7,642	.2	6,439	.2
Belgium[3]	3,219,760	1,873,138	58.2	77,024	2.4	708,908	22.0	(2)	(2)	(2)	(2)	13,807	.4	400,406	12.4	136,806	4.3	9,671	.3
Austria-Hungary	2,171,226	468,626	21.6	230,690	10.6	.....	.....	926,133	42.7	29,760	1.4	430,098	19.8	24,805	1.1	7,363	.3	53,751	2.5
Italy	804,487	207,453	25.8	494,651	61.5	.....	.....	.....	.....	87,025	10.8	6,963	.9	4,015	.5	(2)	(2)	4,380	.5
Australia	617,378	548,030	88.8	5,544	.9	.....	.....	.....	.....	.....	.....	3,478	.5	.....	.....	58,999	9.6	1,327	.2
Argentina	588,830	544,666	92.5	2,448	.4	.....	.....	.....	.....	.....	.....	1,727	.3	(2)	(2)	39,965	6.8	24	.1
Switzerland	479,203	6,430	1.3	267,772	55.9	[4]199,000	41.5	1,224	.3	.....	.....	1,914	.4	.....	.....	765	.2	2,098	.4
Brazil	328,729	309,950	94.3	1,696	.5	[5]66	.1	.....	.....	.....	.....	3,242	1.0	497	.1	12,199	3.7	1,079	.3
Chile	171,144	154,117	90.1	113	.1	.....	.....	.....	.....	.....	.....	5,927	3.4	[6]406	.2	10,581	6.2	.....	.....
British South Africa	155,613	142,585	91.6	14	.1	.....	.....	540	.3	.....	.....	96	.1	.....	.....	12,333	7.9	45	1
Denmark	146,302	.....	.....	46,267	31.6	(2)	(2)	(2)	(2)	(2)	(2)	32,641	22.3	54,733	37.4	10,656	7.3	2,005	1.4
Sweden	135,600	193	.1	71,617	52.8	(2)	(2)	(2)	(2)	(2)	(2)	29,914	22.1	24,000	17.7	(2)	(2)	9,876	7.3

[1] Average annual figures are given.
[2] Data not available; included in "all other countries," if any.
[3] Data for 3 years only, 1911-1913, inclusive.
[4] Spain only; none from Portugal.
[5] Portugal only; none from Spain.
[6] Belgium only; none from Holland.

TABLE 6.—*Sources of turpentine imported by foreign countries, 1919 and 1920.*[1]

Importing country.	Average annual imports.	Imported from— United States.		France.		Spain and Portugal.		Russia.		Greece.		Germany.		Holland and Belgium.		Great Britain.		All other countries.	
	Gallons.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.	Gallons.	Per cent.
Great Britain	7,052,042	5,540,752	78.6	865,047	12.3	[2]108,470	1.5	16,926	0.2	(3)	(3)	.....	.....	[4]148,073	2.1	.....	.....	372,774	5.3
Belgium	1,306,105	331,020	25.4	242,929	18.6	489,654	37.5	(3)	(3)	(3)	(3)	9	.....	9,574	.7	207,650	15.9	25,269	1.9
Germany [5]	1,252,113	355,835	28.4	470,721	37.6	[2]133,962	10.7	(3)	(3)	(3)	(3)	.....	.....	46,400	3.7	27,037	2.1	218,158	17.5
Italy	827,710	270,654	32.7	348,423	42.1	116,147	14.0	.....	.....	87,979	10.6	.....	.....	.....	.....	4,507	.6	.....	.....
Holland	796,053	430,580	54.1	220,886	27.7	51,670	6.5	.....	.....	765	.1	.....	.....	26,846	3.4	46,937	5.9	18,369	2.3
Argentina	530,084	528,390	99.7	(3)	(3)	(3)	(3)	.....	.....	.....	.....	.....	.....	(3)	(3)	(3)	(3)	1,694	.3
Switzerland	511,323	20,668	4.4	195,447	38.0	[2]292,919	57.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,289	.4
Australia	464,260	444,310	95.7	(3)	(3)	(3)	(3)	.....	.....	.....	.....	.....	.....	(3)	(3)	7,475	1.6	[6]12,475	2.7
Brazil	430,598	317,610	73.8	(3)	(3)	(3)	(3)	.....	.....	.....	.....	.....	.....	(3)	(3)	(3)	(3)	112,988	26.2
Denmark	167,583	69,997	41.8	49,819	29.7	(3)	(3)	.....	.....	(3)	(3)	13,136	7.8	(3)	(3)	21,587	12.9	13,044	7.8
Chile	156,076	146,512	93.9	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	165	.1	7,636	4.9	[7]1,758	1.1
British South Africa	138,720	130,647	94.2	300	.2	29	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,956	5.1	788	.5
Sweden [8]	114,931	86,207	75.0	11,516	10.1	(3)	(3)	(3)	(3)	440	.3	(3)	(3)	(3)	(3)	6,634	5.8	10,134	8.8

[1] Average annual figures are given.
[2] Spain only; data for Portugal lacking; included in "all other countries," if any.
[3] Data not available; included in "all other countries," if any.
[4] From Belgium; any from Holland included in "all other countries."
[5] For 1920 only; no data available for 1919.
[6] Principally from China and Japan.
[7] Principally from Mexico.
[8] For 1919 only; no data available for 1920.

NOTE.—Complete and specific data are not available for Austria, Hungary, and Czechoslovakia for 1919 and 1920.

TABLE 7.—*Sources of rosin imported by foreign countries, 1910–1913.* [1]

Importing country.	Average annual imports.	Imported from— United States.		France.		Spain and Portugal.		Greece.		Germany.		Holland and Belgium.		Great Britain.		All other countries.	
	Round barrels.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.
Germany	605,691	439,914	72.6	100,491	16.6	55,200	9.1	1,328	0.2	.....	.....	1,451	0.2	917	0.2	[2] 6,390	1.1
Great Britain	429,839	286,741	66.7	78,043	18.2	38,411	8.9	4,453	1.0	(3)	(3)	16,379	3.8	.....	.....	5,812	1.4
Russia	171,142	27,745	16.3	38,257	22.4	.....	.....	2,062	1.2	71,630	41.8	2,262	1.3	17,826	10.4	[2] 11,360	6.6
Austria-Hungary	153,824	82,940	53.9	28,688	18.6	75	.1	2,785	1.8	38,223	24.8	277	.2	361	.2	475	.3
Holland	152,627	113,269	74.2	33,582	22.0	[4] 45	.1	2,664	1.7	1,585	1.0	1,273	.8	145	.1	64	.1
Belgium [5]	152,415	79,749	52.4	37,381	24.5	31,237	20.5	(3)	(3)	(3)	(3)	732	.5	(3)	(3)	3,316	2.1
Italy	72,490	58,384	80.5	4,836	6.7	[6] 66	.1	7,770	10.7	(3)	(3)	158	.2	1,180	1.6	96	.1
Brazil	93,376	91,470	98.0	99	.1	.....	.....	.....	.....	507	.5	23	.1	516	.5	761	.8
Argentina	81,890	74,724	91.2	1,414	1.7	268	.3	.....	.....	1,158	1.4	192	.2	2,917	3.6	1,217	1.5
Australia	36,021	23,178	64.3	3,717	10.3	(3)	(3)	.....	.....	805	2.2	2,795	7.8	4,667	13.0	859	2.4
Dutch East Indies	32,346	7,061	21.8	(3)	(3)	(3)	(3)	(3)	(3)	2,061	6.4	22,142	68.5	897	2.8	185	.6
Sweden	32,331	2,597	8.0	2,005	6.2	(3)	(3)	.....	.....	25,856	80.0	(3)	(3)	27	.1	1,846	5.7
Japan	27,508	21,486	78.1	(3)	(3)	.....	.....	.....	.....	3,568	13.0	(3)	(3)	676	2.5	1,778	6.4
Switzerland	12,336	3,705	30.0	8,151	66.1	.....	.....	329	2.7	118	.9	.....	.....	.....	.....	33	.3
Denmark	7,648	422	5.5	967	12.6	(3)	(3)	(3)	(3)	5,970	78.1	(3)	(3)	(3)	(3)	289	3.8
British South Africa	5,346	2,512	47.0	2,385	44.6	[6] 290	5.4	.....	.....	27	.5	7	.1	117	2.2	8	.2

[1] Average annual figures are given.
[2] Principally from Austria.
[3] Data not available; included in "all other countries," if any.
[4] Portugal only; none from Spain.
[5] For 3 years, 1911–1913, only.
[6] Spain only; none from Portugal.

TABLE 8.—*Sources of rosin imported by foreign countries, 1919–1920.*[1]

Importing country.	Average annual imports.	Imported from— United States.		France.		Spain and Portugal.		Greece.		Germany.		Holland and Belgium.		Great Britain.		All other countries.	
	Round barrels.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.	Round barrels.	Per cent.
Great Britain	404,025	235,233	58.2	117,692	29.2	3,912	0.9	.....	.....	(2)	(2)	[3] 1,704	0.4	.....	.....	[4] 45,484	11.3
Germany [5]	106,500	27,218	25.6	47,440	44.5	18,167	17.1	500	0.5	.....	.....	[6] 63	.1	795	0.7	12,317	11.5
Brazil	89,769	84,425	94.0	30	.1	(2)	(2)	.....	.....	.....	.....	(2)	(2)	(2)	(2)	5,314	5.9
Argentina	[7] 84,375	65,365	77.5	8,097	9.6	(2)	(2)	.....	.....	.....	.....	(2)	(2)	13	.....	10,900	12.9
Belgium	71,770	13,776	19.2	28,768	40.1	[8] 25,623	35.7	.....	.....	(2)	(2)	36	.1	905	1.3	2,662	3.7
Italy	70,057	12,096	17.3	38,800	55.4	[8] 7,421	10.6	10,810	15.4	.....	.....	.....	.....	.....	.....	930	1.3
Japan	68,068	62,636	92.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	.1	5,422	7.9
Dutch East Indies	34,967	17,773	50.8	49	.1	.....	.....	.....	.....	.....	.....	580	1.7	558	1.6	[9] 16,007	45.8
Australia	28,920	24,149	83.5	815	2.8	[10] 178	.6	.....	.....	.....	.....	[3] 378	1.3	2,440	8.4	960	3.4
Sweden	[7] 22,160	15,208	68.6	3,254	14.7	(2)	(2)	200	.9	(2)	(2)	(2)	(2)	540	2.4	2,958	13.3
Holland	18,290	6,858	37.5	8,727	47.7	1,369	7.5	.....	.....	12	0.1	910	4.9	411	2.2	3	.1
Denmark	12,077	5,239	43.4	5,664	46.9	(2)	(2)	(2)	(2)	(2)	(2)	52	.4	262	2.1	860	7.2
Switzerland	8,968	509	5.7	5,624	62.7	[8] 2,830	31.6	.....	.....	.....	.....	.....	.....	.....	.....	5	.....
British South Africa	8,855	1,724	19.5	3,687	41.6	[10] 534	6.0	.....	.....	.....	.....	.....	.....	2,672	30.2	238	2.7
Austria [11]	3,205	27	.8	1,230	38.4	1,233	38.5	379	11.8	46	1.4	231	7.2	53	1.7	6	.2

[1] Average annual figures are given.
[2] Data not available; if any, included in "all other countries."
[3] From Belgium only; any from Holland included in "all other countries."
[4] Principally from India.
[5] 1920 only; no data available for 1919.
[6] From Holland only; any from Belgium included in "all other countries."
[7] For 1919 only; data for 1920 not available.
[8] From Spain only; any from Portugal included in "all other countries."
[9] Principally from India and China.
[10] From Spain only; none from Portugal.
[11] No data for Czechoslovakia or Hungary.

NOTE.—No data available for Russia for 1919 and 1920.

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